



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,164	04/13/2004	Manimaran Muthiah	10013.0005US	3738
33197 7590 05/03/2007 STOUT, UXA, BUYAN & MULLINS LLP 4 VENTURE, SUITE 300 IRVINE, CA 92618			EXAMINER VAINBERG, SIMON	
			ART UNIT 1709	PAPER NUMBER
			MAIL DATE 05/03/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/823,164

Applicant(s)

MUTHIAH ET AL.

Examiner

Simon Vainberg

Art Unit

1744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 23-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☒ Claim(s) 16-22 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 07/15/2004 and 11/15/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claims 1-22, drawn to device for studying cell migration and deformation, classified in class 435, subclass 288.5.
 - II. Claim 23, drawn to method of manufacturing a device, classified in class 435, subclass 288.5.
 - III. Claims 24 –31, drawn to a method of using a device, classified in class 435, subclass 288.5.

The related inventions are distinct, from the other because of the following reasons:

2. Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the device as claimed can be made by materially different process, such as microdrilling or micromilling.
3. Inventions III and I are related as process and apparatus for its practice. The inventions are distinct if it can be shown that either: (1) the process as claimed can be practiced by another and materially different apparatus or by hand, or (2) the apparatus

as claimed can be used to practice another and materially different process. (MPEP § 806.05(e)). In this case the apparatus as claimed can be used in a materially different process, such as mixing different dyes.

4. Inventions II and III are directed to related processes. The related inventions are distinct if the (1) the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect; (2) the inventions do not overlap in scope, i.e., are mutually exclusive; and (3) the inventions as claimed are not obvious variants. See MPEP § 806.05(j). In the instant case, the inventions as claimed the inventions of method of making and method of using the device have different modes of operations and different effects. Furthermore, the inventions as claimed do not encompass overlapping subject matter and there is nothing of record to show them to be obvious variants.

5. Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions require a different field of search (see MPEP § 808.02), restriction for examination purposes as indicated is proper.

6. During a telephone conversation with Mr. Carlos Fisher on April 4, 2007 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-22. Affirmation of this election must be made by applicant in replying to this Office action. Claims 23-31 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

The disclosure is objected to because of the following informalities:

Paragraph 0050 line 2. The word "portitioning" is misspelled.

Paragraph 0050 line 5. There is a word missing between the words "motility" and " blood".

Paragraph 0076 line19. There should be a period after the word "passages".

Appropriate correction is required.

Claim Objections

Claims 16-22 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim cannot depend from other multiple dependent claims. See MPEP § 608.01(n).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1- 9, and 14-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Parce et al. (US Patent 5942443).

Regarding claim 1, the Parce et al. (US Patent 5942443) reference teaches a device comprising: at least two channels being separated by a partitioning wall therebetween (see Fig. 6A, channels 634 and 604), wherein each channel has an inlet and an outlet (Fig. 6A numbers 650 and 652), and at least one through passage is defined in the partitioning wall to allow fluid communication between the two channels (see Fig. 6A, channels 634 and 604 are interconnected by channel 636).

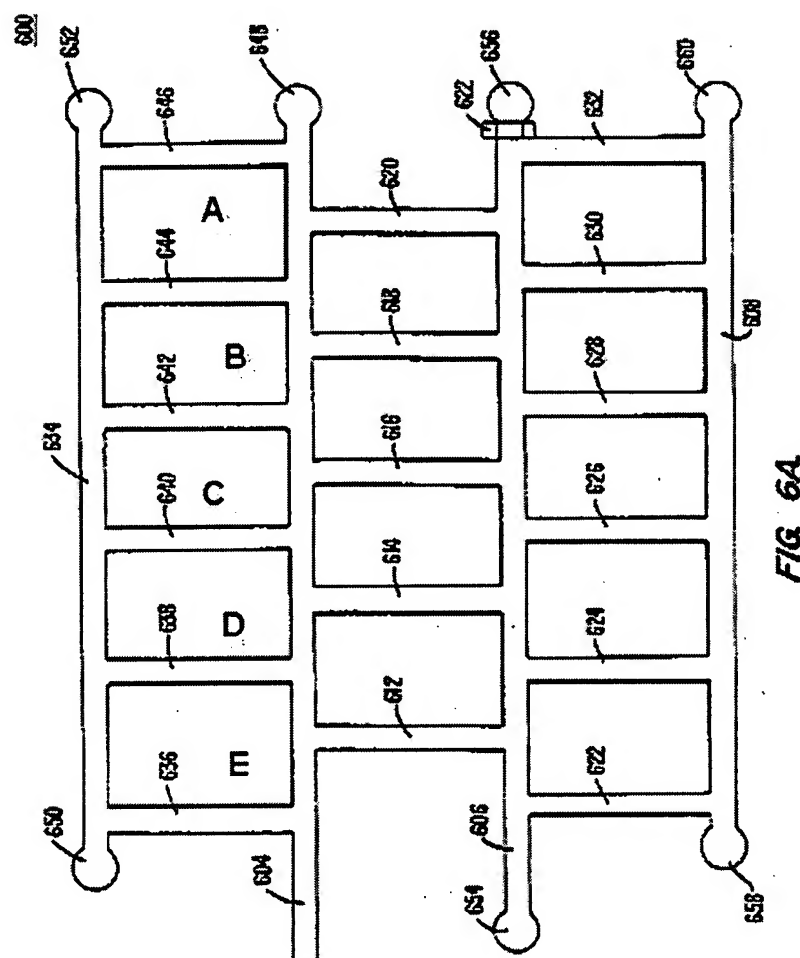
For claim 2, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 1 comprising three channels and two partitioning walls, each of which separates two neighboring channels being separated by a partitioning wall therebetween (see Fig. 6A, channels 634, 604 and 606).

For claim 3, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 1, comprising n channels and $n-1$ partitioning walls, each of which separates two neighboring channels (see Fig. 6A, channels 634 and 604 and partitioning wall between them).

For claim 4, the Parce et al. (US Patent 5942443) reference teaches a device according to claims 2 or 3, wherein the channels lie in a common place (see column 24, claim 22, lines 4-6).

For claim 5, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 1, wherein at least two passages are defined in each of the at least one partitioning wall (see Fig. 6A, channels 634 and 604 and interconnected channels 636 and 638).

For claim 6, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 5, wherein the partitioning wall comprises: two wall sections separated by a gap therebetween; and at least one partitioning element in the gap that divides the gap to form the two passages (see attached Fig. 6A, where A and C are two wall sections separated by gap between them and B is partitioning element in the gap that divides the gap to form the two passages 644 and 642.)



For claim 7, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 6, wherein the partitioning wall comprises at least two partitioning elements that divide the gap into at least three passages (see attached Fig.6A, where A and D are two wall sections separated by gap between them and B and C are two partitioning elements that divide the gap into three passages 644, 642 and 640).

For claim 8, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 7, wherein the partitioning wall comprises m partitioning elements that divide the gap into at least m+1 passages (see attached Fig.6A, where

for example A and E are wall sections separated by gap between them and B, C and D are three partitioning elements that divide the gap into four passages 644, 642, 640 and 638).

For claim 9, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 7, wherein the partitioning elements are at least substantially evenly spaced apart to form passages of at least substantially equal widths (see attached Fig.6A, where for example A and E are wall sections separated by gap between them and B, C and D are three partitioning elements that evenly spaced apart to form four passages 644, 642, 640 and 638 of equal widths).

For claim 14, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 2, wherein the thickness of at least one of the partitioning walls is different than that of the other partitioning walls (see Fig.3, where the thickness of the one of the partitioning wall between channels 304 and 306 is different than the thickness of the other partitioning wall between channels 306 and 308).

For claim 15, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 14, wherein the thicknesses of the partitioning walls are different from each other (see Fig.3, where the thickness of the one of the partitioning wall between channels 304 and 306 is different than the thickness of the other partitioning wall between channels 306 and 308).

For claim 16, the Parce et al. (US Patent 5942443) reference teaches a device according to any of the preceding claims wherein the device comprises:
a substrate whose surface has grooves that define the at least two channels and at least one passage; and a cover that is attached to the surface of the substrate (see column 9 lines 8 -15 and column 19 lines 6-14).

For claim 17, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 16, wherein the substrate is molded using a biocompatible material (see column 8 lines 13-23).

For claim 18, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 17, wherein the biocompatible material is at least substantially translucent (column 8 lines 27-36 teaches transparent material which is necessary translucent).

For claim 19, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 16, wherein the cover is of a biocompatible material (see column 9 lines 11-15. Glass is considered to be a biocompatible material).

For claim 20, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 19, wherein the biocompatible material is at least substantially

translucent (see column 9, lines 11-15. Glass is considered to be a translucent material).

For claim 21, the Parce et al. (US Patent 5942443) reference teaches a device according to claim 17, wherein the biocompatible material comprises one of glass, silicon and a polymerizable material (see column 8, lines 21-23).

For claim 22, the Parce et al. (US Patent 5942443) discloses a device according to claim 21, wherein the polymerizable material is comprises a material selected from the group consisting of polycarbonate (monomer), polyacrylic (monomer), polyoxymethylene (monomer), polyamide (monomer), polybutylenterephthalate (monomer) and polyphenylenether (monomer), polydimethylsiloxane (PDMS) (monomer), mylar (monomer), polyurethane (monomer), polyvinylidene fluoride (PVDF) (monomer), flourosilicone (monomer) and combinations and mixtures thereof (see column 8, lines 36-42).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Parce et al. (US Patent 5942443) in view of Austin et al. (US Patent 5837115).

Regarding claim 10, the Parce et al. (US Patent 5942443) reference discloses the claimed invention according to claim 7 except for the partitioning elements are unevenly spaced apart to form passages of widths that vary along the length of the partitioning wall.

Reference Austin et al. (US Patent 5837115) teaches that obstacles can have a staggered pattern, or any desired predetermined and reproducible pattern (see column 10 line 40-45 and lines 59-66). According to Fig.3 number 39, "obstacles" are considered the same as "partitioning elements".

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Parce et al. by arranging the partitioning elements in any desired predetermined pattern as taught by reference Austin et al., because such a modification would allow this device to be used for evaluating the minimum width of the through passage that is needed for a specific type of cell to migrate through blood capillaries.

Regarding claim 11, the Parce et al. (US Patent 5942443) reference discloses the claimed invention according to claim 10 except for the widths of the passages increases along the length of the partitioning wall.

Reference the Austin et al. (US Patent 5837115) teaches that obstacles can have a staggered pattern, or any desired predetermined and reproducible pattern (see column 10 line 40-45). Each of the obstacles is separated from an adjacent obstacle by a predetermined separation distance (see column 10 lines 52,53) to form passages. These dimensions can be changed and designed to be as desired (see column 10 lines 59-66) to form passages of different width.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of the Parcel et al. by changing the

separation distance between the obstacles as taught by reference Austin et al. to increase the width of passages. It would allow to fractionate the cells of different shapes and to study their motility.

Regarding claim 12, the Parcel et al. (US Patent 5942443) reference discloses the claimed invention according to claim 7 except for the partitioning elements have one of semi-circular, circular, polygonal and an elongated cross section.

Reference Austin et al. (US Patent 5837115) teaches that the shapes of the obstacles may vary (see column 14 lines 7-8).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Parcel et al. by fabricating partitioning elements according to any predetermined shape as taught by reference Austin et al. because it would allow to modulate fluid flow profiles across passage to thereby direct the flow of cells to the desired channel, permitting the study of its effect on cell migration.

Regarding claim 13, the Parce et al. (US Patent 5942443) reference discloses the claimed invention according to claim 12 except for the elongated cross-section is rounded at at least one end thereof.

Reference Austin et al. (US Patent 5837115) teaches that the shapes of the obstacles may vary (see column 14 lines 7-8).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the device of Parce et al. by fabricating elongated cross-section of rounded shape as taught by reference Austin et al. because it will allow to mimic the endothelial cells that are located on vessel walls.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Simon Vainberg whose telephone number is 571-270-3150. The examiner can normally be reached on Monday-Thursday from 7:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Walter Griffin can be reached on 571-272-1447. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/823,164
Art Unit: 1744

Page 15

SV
04-13-2007


WALTER D. GRIFFIN
SUPERVISORY PATENT EXAMINER